



**Rules and
Regulations
for the Classification
of Inland
Waterways Ships,
November 2008**

Notice No. 3

Effective Date of Latest

Amendments:

See page 1

Issue date: January 2010

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**RULES AND REGULATIONS FOR THE CLASSIFICATION OF
INLAND WATERWAYS SHIPS,
November 2008**

Notice No. 3

This Notice contains amendments within the following Sections of the *Rules and Regulations for the Classification of Inland Waterways Ships, November 2008*. The amendments are effective on the dates shown:

Part	Chapter	Section	Effective date
1	2	1, 2, 3	1 July 2010
3	1	4, 7	1 July 2010
3	5	2, 6, 8	1 July 2010
3	7	1	1 July 2010
3	11	7, 10	1 July 2010
3	12	2, 3	1 July 2010
4	1	9, 11	1 July 2010
4	4	1	1 July 2010
4	6	4, 5, 7, 10	1 July 2010

The *Rules for Inland Waterways* are to be read in conjunction with this Notice No. 3.
The status of the Rules is now:

Rules for Inland Waterways
Notice No. 1
Notice No. 2
Notice No. 3

Effective date: November 2008
Effective date: 1 March 2009
Effective date: 1 April 2009
Effective date: 1 July 2010

Part 1, Chapter 2
Classification Regulations**Effective date 1 July 2010****■ Section 1**
Conditions for classification**1.1 General**

1.1.3 Ships built in accordance with Lloyd's Register's (hereinafter referred to as LR) Rules and Regulations, or in accordance with requirements equivalent thereto, will be assigned a class in the *Register Book* and will continue to be classed as long as they are found, upon examination at the prescribed surveys, to be maintained in accordance with the requirements of the Rules. Classification will be conditional upon compliance with LR's requirements for both hull and machinery and with the certification requirements of 1.1.

1.1.4 The Classification Committee, in addition to requiring compliance with LR's Rules, may require to be satisfied that ships of special types are suitable for the conditions of the service contemplated.

1.1.5 Any damage, defect or breakdown, grounding, serious deficiency, detention or arrest which could invalidate the conditions for which a class has been assigned, is to be reported to LR without delay.

1.1.6 The Rules are framed on the understanding that ships will be properly loaded and handled. They do not, unless stated or implied in the class notation, provide for special distributions or concentrations of loading. The Classification Committee may require additional strengthening to be fitted in any ship, which, in their opinion, would otherwise be subjected to severe stresses due to particular features in the design, or where it is desired to make provision for exceptional loaded or ballast conditions. In such cases, particulars are to be submitted for consideration, see also the relevant ship type Chapters in Part 4.

1.1.8 For ships, the arrangements and equipment of which are required to comply with the requirements of either the:

- European Agreement concerning the international carriage of dangerous goods by inland waterways (ADN); or
- European Agreement concerning the international carriage of dangerous goods by inland waterways on the river Rhine (ADNR); or
- Règlement de visite des bateaux du Rhin 1995 (Rhine inspection regulations) or
- EC Directive (2006/87/EC) DIRECTIVE of the EUROPEAN PARLIAMENT and of the COUNCIL of 12 December 2006 laying down technical requirements for inland waterway vessels; or
- Any National regulations specified by the Government of the Flag State,

and applicable Amendments thereto, the Classification Committee requires the applicable Certificates to be issued by a National Administration, or by LR, or by an IACS Member when so authorized.

1.2 Advisory services

1.2.1 The Rules do not cover certain technical characteristics, such as stability, trim, hull vibration, etc., but the Committee is willing to advise advice may be given on such matters although it cannot assume without any assumption of responsibility for them such advice.

1.2.2 Where a vessel is so badly damaged that class has to be suspended, LR is prepared to assist the Owner with advice if requested.

■ Section 2
Character of classification and class notations**2.2 Character symbols**

2.2.2 A full list of character symbols for which ships may be eligible is as follows:

☒ This distinguishing mark will be assigned, at the time of classing, to new ships constructed under LR's Special Survey, in compliance with the Rules, and to the satisfaction of the Classification Committee.

A This character letter will be assigned to all ships which have been built or accepted into class in accordance with LR's Rules and Regulations, and which are maintained in good and efficient condition.

1 This character figure will be assigned to:
(a) Ships having on board, in good and efficient condition, anchoring and/or mooring equipment in accordance with the Rules.
(b) Ships classed for a special service, for which no specific anchoring and mooring Rules have been published, having on board, in good and efficient condition, anchoring and/or mooring equipment approved by the Classification Committee as suitable and sufficient for the particular service.
(c) Ships having on board, in good and efficient condition, anchoring and/or mooring equipment in accordance with established National or International Regulations and approved by the Classification Committee as suitable and sufficient for the particular service. The service limits where applicable may be entered in the class notation.

N This character letter will be assigned to ships on which the Classification Committee has agreed that anchoring and mooring equipment need not be fitted in view of their particular service.

T This character letter will be assigned to ships which are intended to perform their primary designed service function only while they are anchored, moored, towed or pushed, and which have, in good and efficient condition, adequately attached anchoring, mooring, towing or pushing equipment which has been approved by the Classification Committee as suitable and sufficient for the intended service.

2.3 Class notations (hull)

2.3.1 When considered necessary by the Classification Committee, or when requested by an Owner and agreed by the Classification Committee, a class notation will be appended to the character of classification assigned to the ship. This class notation will consist of one of, or a combination of: a type notation, a cargo notation, a loading sequence notation, a loading notation, an 'ICE' notation and zone notation, e.g. A1 I.W.W., L.S. 'O', ICE, Zone 2.

2.4 Class notations (machinery)

(Part only shown)

2.4.1 The following class notations may be assigned as considered appropriate by the Classification Committee:

[H] LMC This notation will be assigned when the propelling arrangements, steering systems, pressure vessels and the electrical equipment for essential systems have been constructed, installed and tested under LR's Special Survey and are in accordance with LR's Rules and Regulations. Other items of machinery for propulsion and electrical power generation including propulsion gearing arrangements and other auxiliary machinery for essential services that are in compliance with LR Rules and supplied with the manufacturer's certificate will be acceptable under this notation. The system arrangements of propelling and essential auxiliary machinery are required to be appraised by LR, and found to be acceptable to LR. See Section 2.6.2.

MCH This notation will be assigned when the propelling and essential auxiliary machinery has been installed and tested under LR's survey requirements and found to be acceptable to LR. Items of machinery and equipment for propelling and auxiliary machinery for essential services supplied with the manufacturer's certificate will be acceptable under this class notation. The system arrangements of propelling and essential auxiliary machinery are required to be appraised by LR, and found to be acceptable to LR. See Section 2.6.3.

2.5 Descriptive notes

2.5.1 In addition to any class notations, an appropriate descriptive note may be entered in Column 6 of the *Register Book* indicating the type of ship in greater detail than is contained in the class notation, and/or providing additional information about the ship's design and construction. This descriptive note is not an LR classification notation and is provided solely for the information of users of the *Register Book*.

2.6 Application notes

(Part only shown)

2.6.2 **Manufacturer's certificate** for assignment of the **[H]LMC** notation. Acceptance of the manufacturer's certificate for items of machinery for propulsion (including propulsion gearing with single input/output arrangements) and for electrical power generation and for other auxiliary machinery for essential services is subject to the following:

- (c) Propulsion power is provided by oil engines or gas turbines which have been type approved ~~to~~ in accordance with LR requirements for marine application.
- (d) Electrical power is provided by generators driven by oil engines or gas turbines which have been type approved ~~to~~ in accordance with LR requirements for marine application.

(Part only shown)

2.6.3 **Manufacturer's certificate** for assignment of the **MCH** notation. Acceptance of the manufacturer's certificate for propelling and essential auxiliary machinery is subject to the following:

- (b) Propulsion power is provided by oil engines or gas turbines which have been type approved ~~to~~ in accordance with LR requirements for marine application.
- (c) Electrical power is provided by generators driven by oil engines or gas turbines which have been type approved ~~to~~ in accordance with LR requirements for marine application.
- (e) The design and manufacturing standards for machinery and associated engineering systems are the applicable LR Rules or other marine standards acceptable to LR.

■ Section 3 Surveys – General

3.1 Statutory surveys

3.1.1 The Classification Committee will act, when authorized on behalf of Governments, in respect of National and International statutory safety and other requirements for passenger, cargo and other ship types.

3.2 New construction surveys

3.2.1 When it is intended to build a ship for classification with LR, constructional plans and all necessary particulars relevant to the hull, equipment and machinery as detailed in the Rules, are to be submitted for the approval ~~of the Committee~~ before the work is commenced. Any subsequent modifications or additions to the scantlings, arrangements or equipment shown on the approved plans are also to be submitted for approval.

Part 1, Chapter 2

3.2.2 Where the proposed construction of any part of the hull or machinery is of novel design, or involves the use of unusual material, or where experience, in the opinion of the Classification Committee, has not sufficiently justified the principle or mode of application involved, special tests or examinations before and during service may be required. In such cases a suitable notation may be entered in the Register Book assigned.

3.2.3 The materials used in the construction of hulls and machinery intended for classification are to be of good quality and free from defects and are to be tested in accordance with the requirements of LR's *Rules for the Manufacture, Testing and Certification of Materials*. The steel is to be manufactured by an approved process at an approved works recognized by the Committee. Alternatively, tests to the satisfaction of the Committee, will be required to demonstrate the suitability of the steel.

3.2.5 Copies of approved plans (showing the ship as built), essential certificates and records, required loading and other instruction manuals are to be readily available for use when required by LR's the attending Surveyors, and may be required to be kept on board.

3.2.8 The date of completion of the Special Survey during construction of ships built under LR's inspection will normally be taken as the date of build to be entered in the Register Book LR Publication Record. If the period between launching and commissioning is, for any reason, unduly prolonged, the dates of launching and completion or commissioning may be separately indicated in the Register Book LR Publications.

3.2.9 When a ship, upon completion, is not immediately commissioned but is laid-up for a period, the Classification Committee, upon application by the Owner, prior to the ship proceeding to sea, will direct an examination to be made by LR's the Surveyors which may include a survey in dry-dock. If, as the result of such a survey, the hull and machinery be reported in all respects free from deterioration in accordance with applicable Rule requirements, the subsequent Special Survey and Complete Survey of the machinery will date from the time of such examination.

3.3 Existing ships

3.3.1 **Classification of ships not built under survey.** The requirements of the Classification Committee for the classification of ships which have not been built under LR's Survey are indicated in Chapter 3. Special consideration will be given to ships transferring class to LR from another recognized Classification Society.

3.3.2 **Reclassification.** When reclassification or class reinstatement is desired for a ship for which the class previously assigned by LR has been withdrawn or suspended, the Classification Committee will direct that a survey appropriate to the age of the ship and to the circumstances of the case, be carried out by LR's the Surveyors. If, at such survey, the ship be found or placed in a good and efficient condition in accordance with the requirements of the Rules and Regulations, the Classification Committee will be prepared to consider reinstatement of the original class or the assignment of such other class as may be deemed necessary.

3.3.3 The Classification Committee reserves the right to decline an application for classification or reclassification where the prior history or condition of the ship indicates this to be appropriate.

3.3.4 **Unscheduled surveys.** Where the Classification Committee has concern about the condition of a ship and/or the equipment an unscheduled survey may be required at any time to determine the actual condition.

3.4 Repairs and alterations

3.4.1 All repairs to hull, equipment and machinery which may be required in order that a ship may retain her class, see Section 1.1.5 above, are to be carried out to the satisfaction of LR's the Surveyors. When repairs are effected at a port, terminal or location where the services of a Surveyor to LR are not available, the repairs are to be surveyed by one of LR's the Surveyors at the earliest opportunity thereafter.

3.4.2 When at any survey the Surveyors consider repairs to be necessary, either as a result of damage, or wear and tear, they are to communicate their recommendations at once to the Owner, or his representative. When such recommendations are not complied with, immediate notification is to be given to the Classification Committee by the Surveyors.

3.4.3 When, at any survey, it is found that any damage, defect or breakdown (see Section 1.1.5) is of a nature that does not require immediate permanent repair, but is sufficiently serious to require rectification by a prescribed date in order to maintain class, a suitable condition of class is to be imposed by the Surveyors and recommended to the Classification Committee for consideration.

3.4.6 Plans and particulars of any proposed alterations to the approved scantlings and arrangements of hull, equipment, or machinery are to be submitted for approval, and such alterations are to be carried out to the satisfaction of LR's the Surveyors.

3.5 Existing ships – Periodical Surveys

3.5.8 When it is inconvenient for an Owner to fulfil all the requirements of a Special Survey at its due date, the Committee will be prepared to consider its postponement, either wholly or in part, provided that LR's Surveyors are afforded an opportunity, about the due date, of assessing the general condition of the hull. For this purpose, the Classification Committee will normally call for a General Examination of the ship of sufficient extent and which may include dry-docking (depending on age and records of the ship) to be assured that its condition is satisfactory for the period of grace desired, which is not to exceed 12 months from the due date. Attention is drawn to relevant regulations of the National Authorities of the country where the ship is registered.

3.5.10 Complete Surveys of machinery become due at five yearly intervals, the first one five years from the date of build or date of first classification as recorded in the Register Book ClassDirect Live, and thereafter five years from the date of the previous Complete Survey.

3.5.14 When it is inconvenient for an Owner to fulfil all the requirements of a Complete Survey at its due date, the Committee will be prepared to consider its postponement, either wholly or in part, provided that LR's the Surveyors are afforded an opportunity, about the due date, of assessing the general condition of the machinery. For this purpose, the Classification Committee will normally require a General Examination to be made of sufficient extent to assure them that the condition of the machinery is satisfactory for the period of grace desired, which is not to exceed 12 months from the due date. Attention is drawn to relevant Regulations of the National Authorities of the country where the ship is registered.

3.6 Certificates

3.6.1 When the required reports, on completion of the Special Survey of new or existing ships which have been submitted for classification, have been received from the Surveyors and classification has been agreed by the Classification Executive a Certificate of Classification may be issued by an authorised Surveyor. and approved After approval by the Classification Committee, a certificate of First Entry of Classification, signed by the LR's Chairman, or the Deputy Chairman and Chairman of the Sub Committees of Classification Committee, will be issued to Builders or Owners.

3.6.3 LR's The Surveyors are permitted to issue provisional (interim) certificates to enable a ship intended for classification, or already classed, with LR to commence service or to proceed on its voyage (or to continue service in the case of a fixed or tethered ship) provided that in their opinion it is in a fit and efficient condition. Such certificates will embody the Surveyor's recommendations for classification or for continuance of class, but in all cases are subject to confirmation by the Classification Committee.

3.6.4 The full class notation and abbreviated descriptive notes shall be stated on the Certificate of Class and provisional (interim) certificate.

3.7 Notice of surveys

3.7.1 It is the responsibility of the Owners to ensure that all surveys necessary for the maintenance of class are carried out at the proper time and in accordance with the instructions of the Classification Committee. Information is available to Owners on the ClassDirect Live website.

3.8 Withdrawal/Suspension of class

3.8.1 When the class of a ship, for which the Regulations as regards surveys on hull, equipment and machinery have been complied with, is withdrawn by the Classification Committee in consequence of a request from the Owner, the notation 'Class withdrawn at Owner's request' (with date) will be assigned.

3.8.2 When the Regulations as regards surveys on the hull, equipment or machinery have not been complied with and the ship is thereby not entitled to retain class, the class will be suspended or withdrawn, at the discretion of the Classification Committee, and a corresponding notation will be assigned.

3.8.4 Class will be automatically suspended from the expiry date of the Certificate of Class in the event that the Special Survey has not been completed by the due date and an extension has not been agreed (see Section 3.5.8), or is not under attendance by the Surveyors with a view to completion prior to resuming trading.

3.8.5 When, in accordance with Section 3.4.3 of the Regulations, a condition of class is imposed, this will be assigned a due date for completion and the ship's class will be subject to a suspension procedure if the condition of class is not dealt with, or postponed by agreement, by the due date.

3.8.6 When it is found, from the reported condition of the hull or equipment or machinery of a ship, that an Owner has failed to comply with Regulations Sections 1.1.5, 3.4.1 or 3.4.5, the class will be liable to be suspended or withdrawn, at the discretion of the Classification Committee, and a corresponding notation assigned. When it is considered that an Owner's failure to comply with these requirements is sufficiently serious, the suspension or withdrawal of class may be extended to include other ships controlled by the same Owner, at the discretion of the Classification Committee.

3.8.8 Where a ship has been detained following a intervention by local authorities on two or more occasions in a two year period, with serious deficiencies found, then the class will be liable to be suspended or withdrawn, at the discretion of the Classification Committee, and a corresponding notation will be assigned. In these cases, a period of notice, not exceeding 3 months, may be given prior to any suspension or withdrawal of class.

3.8.9 In all instances of class withdrawal or suspension, the assigned notation, with date of application, will initially appear in the Register Book. In cases where class has been suspended by the Committee and it becomes apparent that the Owners are no longer interested in retaining LR's Class, the notation will be amended to withdrawn status. After class withdrawn status has been established in the Register Book for one year, it will be automatically amended to 'Classed LR until' (with date).

3.8.9 In all instances of class withdrawal or suspension, the assigned notation, with date of application, will be published by members of the LR Group. In cases where class has been suspended by the Classification Committee and it becomes apparent that the Owners are no longer interested in retaining LR's class it will be withdrawn.

3.8.10 For reclassification and reinstatement of class, see Section 3.3.2.

Part 1, Chapter 2 & Part 3, Chapter 1

3.9 Appeal from Surveyors' recommendations

3.9.1 If the recommendations of LR's the Surveyors are considered in any case to be unnecessary or unreasonable, appeal may be made to the Classification Committee who may direct a Special Examination to be held.

3.10 Force majeure

3.10.1 If due to circumstances reasonably beyond the Owner's or LR's control, as defined below, the ship is not in a port when surveys become overdue the Classification Committee may allow the ship to sail, in class, directly to an agreed discharge port and then, if necessary, in ballast to an agreed repair facility at which the survey can be completed. In this context 'Force Majeure' means damage to the ship, unforeseen inability of Surveyors to attend the ship due to governmental restrictions on right of access or movement of personnel, unforeseen delays in port or inability to discharge cargo due to unusually lengthy periods of severe weather, strikes, civil strife, acts of war or other force majeure.

3.11 Ownership details

3.11.1 It is the responsibility of each the Owner to inform LR a member of the LR Group in writing of any change to its contact details and in the event of a ship sale to supply details of the new Owners. If the new Owner of a ship cannot be properly identified and the contact details established then the class of that ship will be specially considered by the Classification Committee. It is the responsibility of the new Owner to inform a member of the LR Group in writing of their contact details and that they are now responsible for the ship, if they fail to do so then the class of that ship will be specially considered by the Classification Committee.

Part 3, Chapter 1

General

Effective date 1 July 2010

■ Section 4 National and International Regulations

4.1 International Conventions Regulations

4.1.1 Attention is drawn to the necessity to comply with National and International Technical and Operational Regulations of countries, where the ship is registered or operating and which may also contain requirements which are outside classification as defined in these Rules, e.g.

- The Directive of the European Parliament and of the Council of 12 December 2006 laying down technical requirements for inland waterway vessels (2006/87/EC).
- The 'Rhine Inspection Regulations' of the Central Rhine Commission (CCNR).
- The Regulations of the Central Rhine Commission (CCNR) concerning the transport of dangerous goods on the river Rhine (ADNR).
- The Regulations concerning the European Agreement on the International carriage of dangerous goods by River (ADN).

4.1.2 Ships for which a service extension notation is desired may require the issue of a Load Line Certificate.

4.1.2 The exemptions and derogations to the regulations mentioned in 4.1.1, as authorised by the relevant authorities, may also be taken into consideration.

■ Section 7

Inspection, workmanship and testing

7.3 Acceptance testing on completion

Table 1.7.2 Testing requirements (see continuation) (Part only shown)

Item to be tested	Pressure testing requirements	Leak testing requirements – air pressure
All ship types, where appropriate		
Deep tanks, bunkers, peak tanks, side tanks, combined double bottom and side tanks, (including closing arrangements)	1 m head above the highest point of the tank, excluding hatchway, or to the top of the overflow, whichever is the greater, but is to be not less than 1p m above the top of the tanks where p is the relative density (specific gravity) of the intended cargo	0,007 N/mm ² (0,07 kgf/cm ²)
Water ballast tanks	As for deep tanks	As for deep tanks
Cargo holds used for ballast	Depending on approved height of ballast in hold	As for deep tanks
Scupper and discharge pipes in way of tanks	As for deep tanks	As for deep tanks
Peak bulkheads not forming boundaries of tanks	Peaks to be filled with water to the level of the load waterline	—
Double plated rudders and nozzle	1 m head, and rudder should normally be tested while laid on its side —	0,01 N/mm ² (0,10 kgf/cm ²), and arrangements made to ensure that no pressure in excess of 0,015 N/mm ² (0,15 kgf/cm ²) can be applied
Double bottom tanks	Head of water representing the maximum pressure which could be experienced in service, or to the top of the overflow, whichever is the greater	0,007 N/mm ² (0,07 kgf/cm ²)
Watertight doors (passenger ships)	Each door is to be tested to a head up to the bulkhead deck, either before or after fitting	Not applicable
Void spaces (not accessible)	—	0,007 N/mm ² (0,07 kgf/cm ²)

Part 3, Chapter 5

Fore End and Aft End Structure

Effective date 1 July 2010

■ Section 2

Hull envelope plating

2.8 Crane pedestals

2.8.1 This Section applies to pedestals for cranes and store cranes.

2.8.2 Pedestals, in general, are to be carried through the deck and satisfactorily scarfed into the hull or main support structure. Proposals for other support arrangements will be specially considered.

2.8.3 The pedestal flange in way of the slew ring bearing is to be designed and be of a thickness to provide a rigid and level support for the bearing and bolting. Tolerances and arrangements proposed by the slew ring bearing manufacturer are to be adhered to.

2.8.4 Where it is considered necessary to introduce stiffening brackets to support the flange the spacing of the brackets is to be not greater than that achieved by positioning them between every second bolt.

2.8.5 The pedestal is to be designed with respect to the worst possible combination of loads resulting from the crane self weight, live load and crane accelerations together with those resulting from the ship's heel and trim if anticipated to be greater than 5° and 2° respectively.

2.8.6 In the design of the pedestal, the following allowable stresses should not be exceeded:
Bending stress

$$\sigma_b = 0,58\sigma_y$$

Shear stress

$$\tau = 0,34\sigma_y$$

where

$$\sigma_y = \text{yield stress of material, in N/mm}^2$$

Part 3, Chapter 5

■ Section 6 Fore peak structure

6.5 Collision bulkhead

6.5.3 Doors, manholes, permanent access openings and ventilation ducts are not permitted in the collision bulkhead below the uppermost continuous deck.

6.5.3 For requirements regarding openings in the collision bulkhead, see Ch 7, 1.3.5.

■ Section 8 Sternframes and appendages

8.1 General

8.1.3 Cast stern frames, rudder horns and solepieces are to be manufactured from special grade material, see Ch 4,2 of the Rules for Materials. Cast bossings can be manufactured from normal grade material, see Ch 4,2 of the Rules for Materials.

8.2 Sternframes

Table 5.8.1 Sternframes

Item	Parameter	Requirement	
(1) Propeller posts	A t_1 r l w t_w	Forged or roll steel	Fabricated steel
		for $L \leq 60$ m : $\left(10 + \frac{L}{2}\right) 0,8T \text{ cm}^2$	—
		for $L > 60$ m : $32T \text{ cm}^2$	—
		—	$12 + 0,11L \text{ mm}$
		—	$18 + 0,17L \text{ mm}$
		—	150 T mm
		—	100 T mm
(2) Sternpost in twin screw ships and non-propelled ships	A t_1 r l w t_w	for $L \leq 60$ m : $\left(10 + \frac{L}{2}\right) 0,7T \text{ cm}^2$	—
		for $L > 60$ m : $28T \text{ cm}^2$	—
		—	$8 + 0,07L \text{ mm}$
		—	$12 + 0,11L \text{ mm}$
		—	150 T mm
		—	100 T mm
		—	$5 + 0,05L \text{ mm}$
(3) Propeller shaft boss	t_b	$0,25D_{ts} + 10 \text{ mm}$ ($0,25D_{ts} + t_2$) $\sqrt[3]{ek_0} \text{ mm}$	
(4) Solepieces (open type sternframe) supporting the lower rudder pintle	Z_T	$c_f Ar(V + 5,6)^2 \times (a/b - 0,15) \times 0,95 a/b \text{ cm}^3$ see Note 4	
	Z_V	$0,5Z_T \text{ cm}^3$	
(5) Double arm shaft brackets	Z_T N $M:N$	$(16 \times 10^{-6} \times D_{ts}^3) + 8 \text{ cm}^3$ $\geq 0,05e \text{ mm}$ between 2,5 and 5	
Symbols			

L and T are as defined in 1.4.1

a, b, c = distances, in metres, as shown in Fig. 5.8.2

e = length of the longest shaft bracket strut, in mm

f = coefficient dependent on type of rudder profile and rudder angle, see Table 12.2.5 in Chapter 12
for rudder angles in excess 45° no higher factors than those for rudder angles of 45° need not to be applied.

k_0 = material factor, $= (235/\sigma_0) (24/\sigma_0)$

t_2 = 10 mm for a propeller shaft boss integrated in the sternframe or supported by a single arm bracket and $t_2 = 0$ mm for a propeller shaft boss supported by double arm shaft brackets.

t_b = finished thickness of boss, in mm

t_1, r, l, w, t_w = scantlings of stern post, in mm, as shown in Fig. 5.8.1

A = cross-sectional area of forged or rolled steel stern post, in cm^2

A_r = total rudder area, in m^2

D_{ts} = diameter of tail shaft in way of the boss, in mm

M = the breadth of the shaft bracket strut, in mm, for e, M and N , see also Fig. 5.8.3

N = the thickness of the shaft bracket strut, in mm

V = maximum service speed with the ship in loaded condition, in km/h

Z_T = section modulus against transverse bending, in cm^3

Z_V = section modulus against vertical bending, in cm^3

NOTES

- In fabricated sternframes the connection of the propeller post to the boss is to be by full penetration welding.
- Solepieces supporting movable nozzles will be specially considered.
- The support of a solepiece by a fixed nozzle arrangement will be specially considered.
- The length 'a' of the solepiece should be taken as not less than $0,4b$ in the formula for Z_T .

Part 3, Chapter 7

Bulkheads

Effective date 1 July 2010

■ Section 1 General

1.3 Collision bulkhead

1.3.1 The collision bulkhead is to be positioned not less than $0,04L$ and not more than $0,1L$ from the F.P. Attention is also drawn to additional requirements of National or International Authorities, e.g. 'Inspection Regulations' of the C.C.N.P. Special designs or types of ships requiring another position, will be specially considered. A collision bulkhead is to be arranged at a suitable distance from the forward perpendicular in such a way that, when the forepeak is fully flooded, the floatability of the fully loaded vessel is ensured and a residual safety distance of 100 mm from any opening which cannot be closed weathertight is attained.

1.3.2 As a general rule, the requirement of 1.3.1 shall be considered to have been met if the collision bulkhead has been positioned at a distance between $0,04L$ and $0,04L + 2$ m from the F.P. If the distance exceeds $0,04L + 2$ m, compliance with 1.3.1 shall be proven by direct calculations.

1.3.3 The distance from the F.P. may be reduced to $0,03L$ in which case the requirement of 1.3.1 shall be proven by direct calculations based on the flooding of both forepeak and those compartments directly aft of and adjacent to the collision bulkhead.

1.3.4 Special designs or types of ships requiring another position, will be specially considered.

1.3.2 1.3.5 Doors, manholes, permanent access openings or ventilation ducts are not to be cut in the collision bulkhead below the uppermost continuous deck.

1.3.3 1.3.6 Any recesses or steps in collision bulkheads are to fall within the limits of bulkhead positions.

1.3.4 Oil fuel is not to be carried forward of the collision bulkhead.

1.7 Location of tanks

1.7.1 Oil fuel, lubricating oil and hydraulic oil are not to be carried forward of the collision bulkhead.

1.7.2 Fuel tanks and their fittings shall not be located directly above engines or exhaust pipes.

Part 3, Chapter 11

Closing Arrangements to Openings in Shell and Deck, Ventilators, Air Pipes, Sounding Pipes and Discharges

Effective date 1 July 2010

■ Section 7 Small hatchways

7.1 General

7.1.2 If small hatchways are to be used as emergency exits they shall have a clear opening of not less than $0,36\text{ m}^2$, and the smallest dimension shall be not less than 0,50 m.

■ Section 10 Air and sounding pipes

10.3 Closing appliances

10.3.4 The open ends of air pipes to oil fuel tanks and cofferdams adjacent to these tanks are to be situated where no danger will be incurred from issuing oil or vapour when the tank is being filled and each opening is to be provided with a wire gauze diaphragm of incorrodible material.

Part 3, Chapter 12
Ship Control Systems

Effective date 1 July 2010

■ **Section 2**
Rudders

2.2 Rudder stock and bearings

Table 12.2.1 Rudder stock diameter

Item	Requirement
(1) Basic stock diameter, δ_S , at and below lowest bearing	$\delta_S = 52,4K_R \sqrt[3]{f(V + 5,6)^2 \times \sqrt{A_R^2 x_x^2 + N^2}}$ $\delta_S = 52,4K_R \sqrt[3]{k_o f(V + 5,6)^2 \times \sqrt{A_R^2 x_x^2 + N^2}}$
(2) Diameter in way of tiller, δ_{SU}	$\delta_{SU} = \delta_S$ in (1) with $N = 0$ For spade rudders: $\delta_{SU} \geq 0,7\delta_S$
Symbols	
f = coefficient dependent on type of rudder profile and rudder angle, see Table 12.2.5 k_o = material factor For $\sigma_o > 235$ (24) = $(235/\sigma_o)^{0,75}$ $(24/\sigma_o)^{0,75}$ For $\sigma_o \leq 235$ (24) = $(235/\sigma_o)$ $(24/\sigma_o)$ K_R = rudder coefficient, see Table 12.2.2 x_p = horizontal distance, in metres, see Table 12.2.3 A_R = rudder area, in m^2 N = coefficient dependent on rudder support arrangement, see Table 12.2.4 V = maximum service speed with the ship in the loaded condition, in km/h	
NOTE Where the astern speed is expected to be more than $0,5 \times$ the speed ahead, δ_S will be specially considered. σ_o is to be taken not greater than 70 per cent of the ultimate tensile strength or 450 N/mm^2 ($45,9 \text{ kgf/mm}^2$), whichever is the lesser, so is not to be less than 200 N/mm^2 , see Ch 5.2.4.6 of the <i>Rules for the Manufacture, Testing and Certification of Materials</i> .	

2.3 Rudder construction – Doubled plated

2.3.5 Double plate rudders are to be efficiently coated internally and means for draining the rudder are to be provided in way of the lowest part of the rudder when the rudder is mounted in its normal position.

■ **Section 3**
Fixed and steering nozzles

3.2 Nozzle structure

3.2.7 Care is to be taken in the manufacture of the nozzle to ensure its internal preservation and watertightness. The preservation and testing are to be as required for rudders, see 2.3.5 and Table 1.7.2 in Chapter 1.

3.2.7 Nozzles are to be efficiently coated internally and means for draining are to be provided in way of the lowest part of the nozzle when being mounted in its normal position.

3.2.8 For the testing of nozzles, see Table 1.7.2 in Chapter 1.

**Part 4, Chapter 1
Dry Cargo Ships**

Effective date 1 July 2010

■ **Section 9
Additional requirements for
container ships**

9.6 Stability

9.6.1 For ships navigating on the Rhine, attention
Attention is drawn to the intact stability requirements as
contained in the Rhine Inspection regulations and the Directive
of the European Parliament and of the Council of 12 December
2006 laying down technical requirements for inland waterway
vessels (2006/87/EC).

■ **Section 11
Double skin structure**

11.5 Watertight sub-division

11.5.2 For ships navigating on the Rhine or on European
waterways with an overall length greater than 110 m, compli-
ance with damage stability requirements are mandatory in
accordance with the Rhine Inspection Regulations or with the
Directive of the European Parliament and of the Council of 12
December 2006 laying down technical requirements for inland
waterway vessels (2006/87/EC).

Part 4, Chapter 4

General Requirements Regarding Tankers Carrying Dangerous Liquids in Bulk

Effective date 1 July 2010

■ **Section 1
General**

1.2 International Regulations

1.2.2 The exemptions and derogations to the ADN and
to the ADNR, as authorized by the UNECE and the CCNR,
may also be taken into consideration.

Part 4, Chapter 6
Tankers of Type C and N

Effective date 1 July 2010

■ **Section 4**
**Hull envelope framing –
Transversely framed ships**

4.1 General

Table 6.4.1 Hull framing – Transversely framed ships (Part only shown)

Symbols	
$L, B, D, T, S, s, l_e, h_d, Z, I, \rho$	and t as defined in 1.12.1
d_f	= depth of floor, in mm
h	= the vertical distance from the middle of the effective length of the stiffening member under consideration to the top of the tank, excluding hatchways, in metres
h_b	= the greater of: (a) the depth, D , but need not to be taken greater than $T + 0,4$ m (b) $h_g - 0,4T$ m
h_f	= $h_{de} + h_t h_s$, but not less than 2 m
h_{de}	= the vertical distance at mid-span of the stiffening member under consideration to the deck at side
h_t	= 0 for void spaces or 0,5 m for deeptanks but not less than the actual distance of the top of the overflow above deck
h_g	= $h_p + h_d + 0,2$ m
$h_t h_s$	= test head as defined in Table 1.7.2 in Pt 3, Ch 1, in metres
l_f	= span of floor being $0,5B$ in ships with a centreline bulkhead and in ships with two longitudinal bulkheads the spacing of the bulkheads or $0,4B$, whichever is the greater, in metres
I_s	= span of stringer, in metres
D_2	= D , but need not be taken greater than $T + 0,4$ m
K	= 1 for Category 'O' ships
K	= 0,75 for Category 'T' ships

■ **Section 5**
**Hull envelope framing –
Longitudinally framed ships**

5.1 General

Table 6.5.1 Hull framing – Longitudinally framed ships – Secondary structure

Item	Parameter	Requirement (See Notes 1 and 2)
Bottom longitudinals single skin	Modulus	$Z = K [0,34 + 0,46h_b + L_1 (0,112 - 0,009h_b)] h_b s l_e^2 \text{ cm}^3$
Bottom longitudinals Double skin (see Table 6.5.2)	Modulus	$Z = (3,95 + 0,04L_1) - D_2 s l_e^2 \text{ cm}^3$ $Z = (3,95 + 0,04L_1) \times D_2 s l_e^2 \text{ cm}^3$
Inner bottom longitudinals Double skin (see Table 6.5.2)	Modulus	$Z = 6s l_e^2 h_g \text{ cm}^3$
Side longitudinals, single skin	Modulus	$Z = (4 + 0,04L_1) s l_e^2 h_g \text{ cm}^3$
Side longitudinals, double skin	Modulus	$Z = (4,6 + 0,0342L_1) s l_e^2 h_f \text{ cm}^3$
Deck, trunkside and trunk deck longitudinals	Modulus Inertia	$Z = [h h_g - 3 + (0,18 - 0,02h_g) L_1] h_g s l_e^2 \text{ cm}^3$ $I = 2,3l_e Z \text{ cm}^4$

NOTES

- In case the scantlings of longitudinal members result in an appreciable excess in the hull midship section modulus as required by Pt 3, Ch 4 for the ship type concerned, a reduction in the relevant members may be applied, provided the permissible combined bending stress and the permissible local bending stress are not exceeded. For permissible stresses, see [Section 11](#) [Section 12](#).
- The minimum compartment thickness of the tank structure is not to be less than as required by 1.10.

■ Section 7

Longitudinal and transverse bulkheads of integral cargo tanks

7.1 General

Table 6.7.1 Scantlings of plane and corrugated transverse and longitudinal bulkheads of integral cargo tanks

Item	Parameter	Requirement
Plating	Thickness	Plane bulkheads $t = 4s\sqrt{h_g} + K_c \text{ mm}$ $t = 4s\sqrt{kh_g} + K_c \text{ mm}$ Corrugated bulkheads $t = 4w\sqrt{h_g} + K_c \text{ mm}$ $t = 4w\sqrt{kh_g} + K_c \text{ mm}$
Stiffeners	Modulus	$Z = 6ks l_e^2 h_g$
Corrugations See Note 2	Modulus	$Z = 7,5s l_e^2 h_g$
	Inertia	$Z = 7,5ks l_e^2 h_g$ $I = 3,2l_e Z \text{ cm}^4$
Stringers and webs supporting stiffeners	Modulus	$Z = 6,6k Ss l_e^2 h_g$
Webs supporting stiffeners	Modulus	Z is to be determined from by direct calculations using a stress of 124 N/mm^2 $12,60 \text{ kgf/mm}^2$ $\frac{124}{k} \text{ N/mm}^2 \left(\frac{12,60}{k} \text{ kg/mm}^2 \right)$ assuming fixed ends, in association with the head, h_g

Symbols

Z, I, S, t, s, l_e, p and h_d as defined in 1.12.1

h = load height, in metres, measured vertically as follows:
 (a) for plating, the distance from the lower edge of the plate to the top of the tank
 (b) for stiffening members, the distance from the middle of the effective length to the top of the tank

$$h_g = hp + h_d + 0,2 \text{ m}$$

$$k = \frac{235}{\sigma_0} \left(\frac{24}{\sigma_0} \right) \text{ or } 0,66, \text{ whichever is the greater}$$

where

$$\sigma_0 = \text{specific minimum yield stress in N/mm}^2 (\text{kgf/mm}^2)$$

w = width of flange (b) or web (c), in metres, whichever is the greater, see Fig. 3.3.3 in Pt 3, Ch 3,3

K_c = as defined in Table 6.7.2 1,5 for mild steel, for solid stainless steel, see Table 6.7.2

NOTES

- The minimum compartment thickness of the tank structure is not to be less than as required by 1.10.
- The required section modulus of corrugations is based on a fully clamped connection at the lower end and a simple support at the upper end of the bulkhead. Other arrangements will receive special consideration.
- The basic requirements for the use of higher tensile steels and the associated reduction in required thicknesses and scantlings are, in principle, restricted to transverse bulkheads or longitudinal bulkheads of independent tanks. Structural elements taking part in the global strength of the hull such as integrated longitudinal bulkheads are to be specially considered for compliance with buckling and/or global stress criteria by which the scantlings may need to be increased.
- The proof of satisfactory buckling capabilities of corrugated bulkheads executed in higher tensile steel is to be proven by direct calculations.

■ Section 10

Bunkermasts

10.1 General

10.1.1 A bunkermast is a device consisting of a movable mast or jib provided with cargo lines intended for loading or discharging oil products from the cargo tanks such as diesel oil, fuel oil, petroleum crude oil, petroleum distillates, lubricating oil and bilge water.

10.1.2 The structure of bunkermasts is not covered by this Section. Approval of the structure and structural components of bunkermasts is to be dealt with by the competent authority or inspection body. When authorised, LR is prepared to issue a statement of compliance with a Recognised Standard. Alternatively, upon special request, the bunkermast could be considered for equivalence with the requirements as contained in the *Code for Lifting Appliances in a Marine Environment*.

10.2 Bunkermast pedestals

10.2.1 This Section applies to pedestals for bunkermasts.

10.2.2 Pedestals, in general, are to be carried through the deck and satisfactorily scarfed into the hull or main support structure. Proposals for other support arrangements will be specially considered.

10.2.3 The pedestal flange in way of the slew ring bearing is to be designed and be of a thickness to provide a rigid and level support for the bearing and bolting. Tolerances and arrangements proposed by the slew ring bearing manufacturer are to be adhered to.

10.2.4 Where it is considered necessary to introduce stiffening brackets to support the flange the spacing of the brackets is to be not greater than that achieved by positioning them between every second bolt.

10.2.5 The pedestal is to be designed with respect to the worst possible combination of loads resulting from the bunker crane self weight, loads from attached hoses and internal piping fully filled with oil, bunker crane accelerations together with loads resulting from the ship's heel and trim if anticipated to be greater than 5° and 2° respectively.

10.2.6 In the design of the pedestal, the following allowable stresses should not be exceeded:

Bending stress

$$\sigma_b = 0,58 \sigma_y$$

Shear stress

$$\tau = 0,34\sigma_y$$

where

$$\sigma_y = \text{yield stress of material, in N/mm}^2$$

10.3 Additional requirements

10.3.1 Underdeck spaces in which the swivel mechanism is located are not to be open to cargo tanks, unless the cargo list of the ship is restricted to products mentioned in 10.1.1 only.

Part 4, Chapter 6

10.3.2 Underdeck or enclosed spaces in which the swivel is located are not to be permanently open to cofferdams or double bottom spaces and are to be accessible for inspection purposes under all service conditions. The dimension of the access opening is to comply with Ch 4,3.2.6. This opening is to be capable of being closed by a removable manhole cover or hatch provided with adequate sealing arrangements.

10.3.3 Underdeck or enclosed spaces in which the swivel mechanism is located are to be provided with sounding and independent drainage arrangements.

Existing Sections 10 and 11 are to be renumbered Sections 11 and 12.

Section numbering in brackets reflects any Section renumbering necessitated by any of the Notices that update the current version of the Rules for Inland Waterways Ships.

Part 4, Chapter 6

- Table 6.4.1 *Reference Section 11 now reads Section 12.*
11.3.2 (12.3.2) *Reference 11.3.1 now reads 12.3.1.*
11.4.2 (12.4.2) *Reference 11.3 now reads 12.3.*

Part 5, Chapter 14

- 3.4.5(b) *Reference Ch 11,2.1.3 of the Rules for Materials now reads Chapters 11 and 12 of the Rules for Materials.*

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